

**STATE OF MINNESOTA  
OFFICE OF ADMINISTRATIVE HEARINGS  
FOR THE MINNESOTA PUBLIC UTILITIES COMMISSION**

In the Matter of the Application for  
Certificate of Need and Draft  
Environmental Report, Great River Energy  
& Wright-Hennepin Cooperative Electric  
Association, Plymouth-Maple Grove Large  
High Voltage Transmission Line

FINDINGS OF FACT,  
CONCLUSIONS OF LAW AND  
RECOMMENDATION

The above-entitled matter was heard before Administrative Law Judge Allan W. Klein on May 29, 2003 in the Radisson Hotel, 3131 Campus Drive in Plymouth, Minnesota at 2:00 and 7:00 p.m., and on June 4, 2003, at the Minnesota Public Utilities Commission in St. Paul, Minnesota.

Appearances: Julia Anderson, Assistant Attorney General, 525 Park Street, Suite 500, St. Paul Minnesota 55103, appeared on behalf of the Department of Commerce ("Department"); Alan Mitchell, 658 Cedar Street, 300 Centennial Office Building, St. Paul Minnesota 55155 appeared on behalf of the staff of the Minnesota Environmental Quality Board ("MEQB"); Michael Bradley, Moss & Barnett, 4800 Wells Fargo Center, Minneapolis, Minnesota 55402-4129, appeared on behalf of Great River Energy ("GRE") and Wright-Hennepin Cooperative Electric Association ("WHCEA") (collectively "Applicants") ; David L. Jacobson, Statistical Analyst, 121 Seventh Place East, Suite 350, St. Paul, Minnesota 55101-2147, appeared on behalf of the staff of the Minnesota Public Utilities Commission ("Commission").

The record closed on July 28, 2003, upon receipt of the final post-hearing filing.

Notice is hereby given that, pursuant to Minn. Stat. § 14.61 and the Rules of Practice of the Commission and the Office of Administrative Hearings, exceptions to this Report, if any, by any party adversely affected, must be filed within 15 days of the mailing date hereof with the Executive Secretary, Minnesota Public Utilities Commission, 121 Seventh Place East, Suite 350, St. Paul, Minnesota 55101. Exceptions must be specific, and must be stated and numbered separately. Proposed Findings of Fact, Conclusions and Order should be included, and copies thereof must be served upon all parties. Oral argument before a majority of the Commission will be permitted to all parties requesting such argument who are adversely affected by the Administrative Law Judge's recommendation. Such request must accompany the filed

exceptions, and an original and 15 copies of each document must be filed with the Commission.

The Commission will make the final determination of the matter after the expiration of the above-set forth period for filing exceptions, or after oral argument, if such is requested and had in the matter.

Further notice is hereby given that the Commission may, at its own discretion, accept or reject the Administrative Law Judge's recommendation and that said recommendation has no legal effect unless expressly adopted by the Commission as its final order.

### **STATEMENT OF ISSUE**

Should the Commission issue a Certificate of Need to GRE and WHCEA for the proposed 115 kV Large High Voltage Transmission Line ("LHVTL") in Plymouth-Maple Grove to serve customers in the Plymouth-Maple Grove service area of WHCEA and Connexus Energy ("Connexus"), and if so, should there be any conditions associated with it.

Based upon all of the proceedings herein, the Administrative Law Judge makes the following:

### **FINDINGS OF FACT**

#### **A. Procedural History and the Parties**

1. The Certificate of Need ("CON") Co-Applicant, GRE, is a Minnesota not-for-profit cooperative corporation created when Cooperative Power and United Power Association formed a joint operating company to provide generation and transmission services to their 29 Cooperative members. The CON Co-Applicant WHCEA is one of the 29 Cooperative members. GRE and WHCEA are applying for a CON for a 115 kV LHVTL to provide energy and capacity to the Plymouth – Maple Grove service area of WHCEA. More specifically, the 115 kV LHVTL would be connected to the Xcel Energy Elm Creek Substation at its north end, and would provide energy and capacity to four substations operated by WHCEA (Arbor Lake, Cedar Island, Bass Lake, and Plymouth). It would also provide energy and capacity to the Hennepin Substation operated by Connexus (another Cooperative member of GRE). The 115 kV LHVTL would connect to the Xcel Energy Substation at Parkers Lake on the south end of the line. (Exhibit 2, Section 1.2) ("Ex. 2").

2. GRE/WHCEA filed their Certificate of Need Application and Draft Environmental Report with the Minnesota Public Utilities Commission on November 14, 2002.

3. GRE/WHCEA filed a Supplement to Application For Certificate of Need And Draft Environmental Report on February 5, 2003.

4. The Department and staff of the MEQB intervened.

5. The Commission issued the Notice and Order for Hearing on January 27, 2003. This was published in the EQB Monitor on February 3, 2003 and in the State Register February 3, 2003 issue at 27 S.R. 1266. The Notice of Hearing also appeared in the April 14, 2003 EQB Monitor.

6. Notices of the public hearings concerning this matter and the availability of the Application and Draft Environmental Report were mailed to all persons along the existing 69 kV route and also to residents and businesses located between the current route and the Xcel Energy substations that would serve as the likely end points for the 115 kV LHVTL. A notice was available on GRE's web site. Notices of the public hearings and the availability of the Application and Draft Environmental Report were published in area newspapers. Copies of the various notices and evidence of mailing and publication are contained in Exhibit 1.

7. The purpose of this proceeding is to decide whether there is a need for the proposed 115 kV LHVTL. This proceeding is not to determine the appropriate route for the LHVTL. That will be determined by the MEQB in a separate proceeding.

8. Approximately 35 persons attended the public hearings in Plymouth. No separate public testimony was presented in St. Paul. A few of the public commentators raised questions about the need for the facility, and the Applicants responded and pointed out where in the Application the issue of need was addressed. The majority of the comments, however, addressed the possible route for the LHVTL. Routing issues will be addressed by the MEQB. Two commentators, Jerry Fischer and Carl Olson, acknowledged that they currently encounter routine outages. (Transcript Vol. 2, pp. 39; and 57.) ("Tr. Vol. 2")

## **B. Applicable Statutory and Rule Criteria**

9. Minn. Stat. § 216B.243 prohibits siting or constructing a large energy facility in Minnesota without first obtaining a CON from the Commission. The Applicants propose constructing a 115 kV LHVTL 12.9 miles in length. (Rakow, Ex.16, p. 2.) Minn. Stat. §§ 216B.243, subd. 2 and 216B.2421, subd. 2(3) require a CON for lines with 100 kV or more capacity that are at least 10 miles long. As such, the proposed facility requires a CON from the Commission.

10. Minn. Stat. § 216B.243 and Minn. Rules parts 7849.0010 through 7849.0400 set forth the criteria that must be met to establish need for proposed large energy facilities. As set forth in Minn. Rule 7849.0120, a CON must be granted to the applicant if:

- A. the probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states, considering:

- (1) the accuracy of the applicant's forecast of demand for the type of energy that would be supplied by the proposed facility;
- (2) the effects of the applicant's existing or expected conservation programs and state and federal conservation programs;
- (3) the effects of promotional practices of the applicant that may have given rise to the increase in the energy demand, particularly promotional practices which have occurred since 1974;
- (4) the ability of current facilities and planned facilities not requiring certificates of need to meet the future demand; and
- (5) the effect of the proposed facility, or a suitable modification thereof, in making efficient use of resources;

B. a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record, considering:

- (1) the appropriateness of the size, the type, and the timing of the proposed facility compared to those of reasonable alternatives;
- (2) the cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to the costs of reasonable alternatives and the cost of energy that would be supplied by reasonable alternatives;
- (3) the effects of the proposed facility upon the natural and socioeconomic environments compared to the effects of reasonable alternatives; and
- (4) the expected reliability of the proposed facility compared to the expected reliability of reasonable alternatives;

C. by a preponderance of the evidence on the record, the proposed facility, or a suitable modification of the facility, will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health, considering:

- (1) the relationship of the proposed facility, or a suitable modification thereof, to overall state energy needs;
- (2) the effects of the proposed facility, or a suitable modification thereof, upon the natural and socioeconomic environments compared to the effects of not building the facility;

- (3) the effects of the proposed facility, or a suitable modification thereof, in inducing future development; and
  - (4) the socially beneficial uses of the output of the proposed facility, or a suitable modification thereof, including its uses to protect or enhance environmental quality; and
- D. the record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

11. In addition, Minn. Stat. § 216B.243, subd. 3(a), establishes two criteria for the Commission to consider regarding alternatives to the proposed facility using renewable resources:

- (1) that an applicant has explored the possibility of generating power by means of renewable energy sources; and
- (2) that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source.

For purposes of Minn. Stat. § 216B.243, subd. 3(a), hydropower, wind, solar, geothermal and biomass are considered renewable energy resources.

### **C. The Proposed LHVTL**

12. The proposed facility is a single circuit alternating current line designed and operated at 115 kV. This line would connect WHCEA's Plymouth, Bass Lake, Cedar Island, Arbor Lake substations and Connexus Energy's Hennepin Substation and extend to existing 115 kV sources at Xcel Energy's Parkers Lake Substation on the south, and Xcel Energy's Elm Creek Substation on the north. Specific components of the project are discussed below. Ex. 2, Figure 3-1 identifies the location of these components.

- Add approximately 2.25 miles of 115 kV line to an existing Xcel Energy 115 kV line running southeasterly from Xcel Energy's Elm Creek Substation to its intersection with GRE's existing 69 kV line connecting the Arbor Lake and Hennepin substations. The existing Xcel Energy line would be rebuilt from the existing single circuit configuration to a double circuit configuration for this 2.25-mile distance.
- Rebuild approximately 0.5 mile of 69 kV line to 115 kV from the termination of the 115 kV double circuit line described above to the Hennepin Substation.

- Rebuild to 115 kV, or build new 115 kV, approximately 5.9 miles of existing 69 kV line between the termination of the double circuit 115 kV line described above and WHCEA's Arbor Lake, Cedar Island, Bass Lake and Plymouth substations.
- Build approximately 4.25 miles of new 115 kV line from WHCEA's Plymouth Substation to Xcel Energy's Parkers Lake Substation.
- Convert Connexus Energy's Hennepin Substation, and WHCEA's Arbor Lake, Cedar Island, Bass Lake and Plymouth substations to 115 kV.
- De-energize the existing 69 kV line between WHCEA's Bass Lake and Corcoran substations and GRE's existing 69 kV line between WHCEA's Plymouth and Medina substations.

(Ex. 2, Section 3.2, as modified by the response to IR 59, Ex. 16, SRR-4, pages 15 and 16.)

#### **D. Application of Statutory and Rule Criteria**

##### **(i) Would the Probable Result of Denial of the CON to GRE and WHCEA be an Adverse Effect Upon the Future Adequacy, Reliability and Efficiency of Energy Supply to Their Customers, or to the People of Minnesota and Neighboring States?**

13. As indicated above, a CON must be issued if the probable result of denial would be an adverse effect upon the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant's customers, or to the people of Minnesota and neighboring states. The factors to be considered in assessing adverse effects are:

- a) the accuracy of the applicant's forecast of demand for the type of energy that would be supplied by the proposed facility;
- b) the effects of the applicant's existing or expected conservation programs and state and federal conservation programs;
- c) the effects of promotional practices of the applicant that may have given rise to the increase in the energy demand, particularly promotional practices which have occurred since 1974;
- d) the ability of current facilities and planned facilities not requiring certificates of need to meet the future demand; and
- e) the effect of the proposed facility, or a suitable modification thereof, in making efficient use of resources;

Each of these factors is discussed below.

**Accuracy of the Forecast of Demand for the Type of Energy  
Supplied by the Facility**

14. The Applicants presented the forecasts they had relied upon in determining need for the facility. Five demand scenarios were prepared in the 2000 Wright Hennepin Long-Range Load Forecast ("2000 LRLF"). These scenarios are:

- 1) Most probable economic assumptions, with normal weather. This scenario was the base case throughout.
- 2) Most probable economic assumptions, with severe weather causing higher loads. This scenario was used as an upper bound in projections.
- 3) Most probable economic assumptions, with mild weather causing lower loads.
- 4) Normal weather with more pessimistic macroeconomic assumptions causing lower loads.
- 5) Normal weather with more optimistic macroeconomic assumptions causing higher loads. This scenario more closely matches the historical growth in the area and was used in the transmission contingency analysis.

(Engelking, Ex. 14, pp. 2-3, Ex. 2, Section 6.4.6.)

15. Three of these forecast scenarios were used in the transmission study, as is shown in Ex.2, Sections 8 and 11. Those three scenarios were: scenario #1, that used most probable economic assumptions with normal weather, scenario #5, that used most optimistic macroeconomic assumptions with normal weather, and scenario #2, that used most probable economic assumptions with severe weather.

16. The Application described Scenario 1 as "the base case reported throughout this report." Ex. 2, p. 107. Based on this statement, Dr. Rakow, on behalf of the Department, compared the actual historical accuracy of the WHCEA forecasts to the results using Scenario 1. More specifically, Dr. Rakow compared GRE's forecast of MW used by WHCEA to the actual MW used by WHCEA as provided in Ex. 2, Table 1-1 on page 16, which is reproduced in Ex. 16, SRR-2, with error percentages added. That comparison shows that in 10 of the last 13 years the forecast error was less than 10 percentage points. However, in 2 of the past 4 years the forecast error was greater than 10 percentage points, and the past four years have seen three of the four highest errors. (Ex. 16, p. 7, 11.)

Further, Dr. Rakow performed an analysis using moving averages. Regardless of the moving average selected, the past two years show, by far, the highest error. (*Id.* p. 11.) Based on that comparison, combined with the Department's past criticisms of GRE's forecasting methods in GRE's 2001 resource plan (Docket No. ET2/RP-01-160),

Dr. Rakow raised concerns about the reliability of the Applicants' forecasting methods. (Ex. 16, pp. 7-8 and 11.) In particular, Dr. Rakow was concerned that GRE relies too heavily on judgment and should begin a process of placing the forecasting methods on a more scientific and verifiable basis. (Ex. 16, p. 8.)

17. The existing 69 kV system in the area had a capacity of approximately 72 MW in 2001 during a single contingency and at least 94 MW absent a single contingency. The 72 MW of capacity was increased to 91 MW during a single contingency in the fall of 2002. Reliability should be determined using an n-1 or single contingency criterion (the amount of capacity a transmission line can safely handle during a single contingency). (Rakow, Ex. 16, pp. 9-10.) The summer peak load was about 94 MW in the summer of 2001. Therefore, the experienced load in 2001 was greater than the current reliable supply capability of the system. (Rakow, Ex 16, pp. 3-4 and 8-9.)

18. Dr. Rakow concluded that the Applicants had demonstrated a need for some infrastructure improvements regardless of the forecast because actual historic peak demand in 2001 was greater than the reliable supply. (*Id.* p. 19.) Further, once a decision is made to do something to address the need, it is better to do somewhat more than is needed rather than less, because of the lead-time and lumpiness associated with major electricity infrastructure improvements. (*Id.* pp. 12-13.)

19. Dr. Rakow's Ex. 16, SRR-2, page 3 shows the forecasted growth by substation implicit in GRE's forecasting method. Comparing the growth rates to the map in Ex. 2, Figure 1-2, shows that the two lowest growth rates, those of Medina and Corcoran substations, are in the far western portion of the service area. The remaining five substations are along the proposed route of the 115 kV LHVTL. Of these five substations, the highest growth rates are concentrated in the center of the service area affected by the proposed LHVTL. (*Id.* p. 11.)

20. Dr. Rakow's Ex. 16, SRR-2, page 3, also shows that the overall average annual growth rate for the Plymouth- Maple Grove area implicit in GRE's forecast for the period 2001 to 2026 is approximately 2.7 percent. Dr. Rakow accepted those growth rates given that portions of this area are growing rapidly (see Ex. 2, tables 2-2 and 2-3). (*Id.* p. 12.)

21. Because of concerns with GRE's recent forecasting errors, Dr. Rakow recommended that GRE either conduct additional modeling to develop a forecast band for the purpose of evaluating the losses resulting from the various alternatives, or that GRE accept the risk inherent in relying on its forecast and resulting transmission losses. (*Id.* p. 12.)

22. GRE responded to Dr. Rakow's concerns about the accuracy of the forecasts. (Engelking, Ex. 13, and Alholinna Ex. 14.) The summer demand forecast method, on which data the transmission analysis was performed, is shown in the GRE response to DOC Request No. 51. (Alholinna, Ex. 13. Schedule 1.) As explained on page 108 of the CON Application, the experienced growth in customers caused GRE to



determine the need for the facility based on Demand Alternative 5, (normal weather with more optimistic macroeconomic assumptions causing higher loads). When Alternative 5 is compared to actual peak demand in 2000-2002, (see Table 6-8, page 108 of the CON Application) the forecasted peak demand and actual peak demand are quite close, except for 2001 where the peak demand was higher than forecasted demand due to weather. (Alholinna, Ex. 13, p.2.)

23. Because there was no dispute between the Department and the Applicants that there is an actual need for the proposed facility, both parties elected to resolve any remaining concerns with the Applicants' forecasting methods in GRE's upcoming integrated resource plan filing. (Transcript Vol. 3, p. 12.) Therefore, the ALJ concludes that it is not necessary to make a finding or further recommendation on the accuracy of the supporting forecasts.

### **Effects of Conservation Programs**

24. Dr. Rakow, Ex. 16, pp. 15-16, testified that Ex. 3, pp. 17-18, shows the participation and demand reduction levels estimated for WHCEA's service area for 2001 to 2026. Page 17 of that exhibit shows that the number of total participants is expected to grow by approximately 650 per year. That growth represents an average annual increase of 2.42 percent in total participation. Page 18 shows that total kW savings is expected to grow by approximately 460 kW per year, which represents an average annual increase of 3.24 percent in total kW savings. When compared to the existing demand levels, the likely error in demand side management expectations: a) can be considered too small to affect the reasonableness of the determination of need for additional transmission capacity and b) indicates that conservation programs would be unlikely to reduce demand significantly below the levels already experienced. Therefore, the fact that the peak demand experienced in 2001 exceeded the system's reliable supply capacity indicates that new infrastructure is needed. Rakow, Ex. 16, p. 13.

### **Effects of Promotional Practices**

25. Dr. Rakow raised concerns about the adequacy of the WHCEA demand side management programs. More specifically, Dr. Rakow raised concerns with respect to: a) whether certain demand-side management programs could precipitate the need for intermediate generation; b) the cost-effectiveness of the demand-side management programs; and c) whether WHCEA had provided outdated cost information on alternative fuel costs to its customers, thus favoring the use of electricity. (Ex. 16, pp. 14-18.) However, Dr. Rakow also explained that the proposed LHVTL was needed to meet peak demand and his concerns did not relate to peak demand. (*Id.*, p. 17.)

26. GRE responded to Dr. Rakow's concerns, asserting that its programs are cost effective and encourage the wise use of energy. (Rick Lancaster, Ex. 15.) However, because there is no dispute between the parties that GRE's WHCEA's demand-side management programs caused the need for the LHVTL, both the Department and the Applicants elected to resolve any remaining concerns with GRE's

and WHCEA's conservation programs in GRE's upcoming integrated resource plan filing. (Transcript Vol. 3, p. 12.) Therefore, the ALJ concludes that it is not necessary to make a finding or further recommendation on whether WHCEA's demand-side management programs promote energy use.

### **Ability of Current Facilities and Planned Facilities Not Requiring Certificates of Need to Meet Future Demand**

27. Dr. Rakow concluded that because actual historical peak demand in 2001 was greater than the reliable supply some infrastructure improvements are necessary regardless of the forecast. (Ex. 16, p. 19.) The capacity of the existing transmission system is insufficient to meet the anticipated future demand without overloading the existing transmission lines, which is forecasted by the Applicants to occur as early as the summer of 2004.

28. None of the 69 kV alternatives (Options 2, 3 and 4) or the generation option would need a CON. (Rakow, Ex. 16, p. 18.) As discussed throughout these findings, and as expressly determined by Dr. Ouanes, Ex. 17, p. 30, those alternatives are not more reasonable and prudent than the proposed 115 kV alternative (Option 1).

### **The Effect of the Facility (or a Suitable Modification) in Making Efficient Use of Resources**

29. Development of the Twin Cities metropolitan area is ongoing and will continue whether or not the proposed 115 kV line is built. The area to be served by the facility is generally within the portion of the metropolitan area for which infrastructure is largely in place, contrasted with the degree of infrastructure development in the fringe areas of the metropolitan region. To the extent that the proposed 115 kV line permits development in the Plymouth-Maple Grove area to continue, it permits the more efficient use of existing infrastructure than would any alternative that displaced development to more remote regions of the metropolitan area. In addition, the proposed 115 kV line incurs lower line losses than any alternative, therefore using existing generation facilities in the most efficient manner. (Ex. 2, Section 1.5.1.)

30. People do not move to a particular area because there is adequate electricity; but growth cannot occur without it. As such, the proposed line would remove a barrier to growth but would not induce it. Other factors (transportation access, workforce availability, other infrastructure, available housing and business premises, etc.) are responsible for inducing future development. Even if GRE's improvements do have an incremental effect in inducing development, the effect is beneficial in this instance for the reasons set out in Finding 29 above. (Ex. 2, Section 2.4.)

31. Dr. Rakow, Ex. 16, pp. 18-19, testified that the proposed 115 kV LHVTL would make efficient use of resources. First, it would affect the fewest total miles of transmission (new and rebuilt combined). Thus, it would place the heaviest reliance on the existing grid to provide transmission services. Second, it would involve the fewest number of substation modifications, thus placing the greatest reliance on the existing

grid to provide services. However, the proposed alternative involves several substation conversions, which are not necessary for any other option. Third, the proposed 115 kV LHVTL has the lowest system line losses; both during peak conditions and during average load conditions, thus making the most efficient use of generation resources.

**(ii) Renewable Alternatives to the Proposed Project**

32. Minn. Stat. § 216B.243, subd. 3(a), establishes two criteria for the Commission to consider regarding renewable resources:

- a) that GRE has explored the possibility of generating power by means of renewable energy sources; and
- b) that the alternative selected is less expensive (including environmental costs) than power generated by a renewable energy source.

For purposes of the statute, hydropower, wind, solar, geothermal, and biomass are considered renewable energy resources.

33. Applicants presented testimony on wind generation as a renewable alternative. (Ex. 2, Section 3.3.2.) DOC witness Dr. Ouanes concluded that wind is not a reasonable alternative because it would require approximately 415 acres of land. This amount of land would not be available in the Plymouth-Maple Grove area. Consequently transmission facilities would still be needed to get the output of any wind source to the load. (Ex. 17, p. 9.)

34. Dr. Ouanes concluded that hydropower is not a reasonable alternative because there is no available hydropower site in the Plymouth-Maple Grove area. Consequently transmission facilities would still be needed to get the output of any hydropower source to the load. (Ex. 17, p. 9.)

35. In response to Department Information Request No. 47 (Ex. 18, SO-2) the Applicants stated that solar panels and associated backup systems would require approximately 600 acres of land. This amount of land would not be available in the Plymouth-Maple Grove area. (Ouanes Ex. 17, p. 10.)

36. Dr. Ouanes concluded that geothermal energy fails as a reasonable alternative to the proposed facility because there is no available geothermal site available in the Plymouth-Maple Grove area. (Ex. 17, p. 10.)

37. In response to Department Information Request No. 47, (Ex. 18, SO-2) the Applicants stated that it would be unlikely that biomass facilities, using animal waste, agricultural waste or wood as a fuel source, would be allowed in the residential areas of Plymouth or Maple Grove. In addition, national studies indicate that these facilities cost approximately \$1,448 per kW (1997 dollars), or \$144,800,000 for the required 100 MW of capacity. (Ouanes, Ex. 17, pp. 10-11.)

(iii) **Has a More Reasonable and Prudent Alternative to the Facility Been Demonstrated by a Preponderance of the Evidence on the Record?**

38. A CON cannot be issued if a more reasonable and prudent alternative to the proposed Project is demonstrated by a preponderance of the evidence on the record. The factors to be considered in assessing alternatives are:

- a) appropriateness of the size, the type, and the timing of the proposed facility compared to reasonable alternatives;
- b) cost of the proposed facility and the cost of energy to be supplied by the proposed facility compared to those of reasonable alternatives;
- c) effects of the proposed facility upon the natural and socioeconomic environments compared to those of reasonable alternatives; and
- d) reliability of the proposed facility compared to the expected reliability of reasonable alternatives.

Minn. Rule 7849.0120(B).

**Appropriateness of the Size, Type and Timing of the  
Non-Renewable Alternatives**

39. The Applicants proposed five alternatives. Dr. Ouanes concluded that the size and timing of each of the five alternatives is similar. (Ex. 17, p. 23.) The alternatives examined included:

- a) The proposed 115 kV LHVTL (Option 1).
- b) Upgrading the existing 69 kV Transmission System (Transmission Option 2): The base scenario is a general upgrade of as many as 16 of GRE's existing lines consisting of over 56 miles in the area (Ex. 2, Figure 1-4), with design and construction activities beginning in 2003 and continuing to at least 2023. Upgrades would include replacing the conductors (reconductoring) in virtually all cases, accompanied in many cases by the replacement of existing poles or structures. Load flow requirements, construction scheduling and similar factors would determine timing of the specific line segment upgrades. In addition to basic line upgrades, the installation of shunt capacitors for voltage support would be required in many locations and several bulk transformers would ultimately require replacement. A detailed discussion of this alternative is provided in Ex. 2, Section 3.3.1.
- c) Splitting the existing 69 kV system into stand-alone east and west systems (Option 3): This upgrade scenario incorporates generally the same components set out above for Option 2, but adds a new

6.6 mile 69 kV circuit between GRE's Corcoran switching facility and its Bass Lake Tap (Figure 1-5). This option would divide the eastern portion of the WHCEA system into two loops, one for the northern part of the area (in general, Maple Grove) and one for the southern portion (generally, Plymouth). The result would be enhanced reliability of the systems due to the independent loops. The extent of enhanced reliability would depend on whether the new line was constructed as a second circuit on the existing line between the Corcoran switch and the Bass Lake tap, or as a new line in a different location. Capacitor installations and transformer replacements would be necessary at some locations.

- d) Adding an additional 69 kV Source (Option 4): This 69 kV upgrade scenario incorporates most of the elements of the general upgrade plan but would also add a new 69 kV source at Xcel Energy's Elm Creek Substation (Figure 1-6). The principal benefit of this scenario would be that the area would be served by a fourth source, thus substantially increasing reliability. The need for capacitor and transformer installations at selected locations would remain. This scenario would also require rebuilding several miles of 69 kV line and a new 115/69 kV substation, because Xcel Energy does not have adequate space for a 69 kV transformer at its Elm Creek Substation. This alternative is also more fully discussed in Ex. 2, Section 3.3.1.
- e) Adding new generation facilities located in the Plymouth-Maple Grove area (Option 5): New generation facilities would be located in the corridor area shown on Ex. 2, Figure 1-7. Wind turbines, gas-fed microturbines, and smaller diesel generators were considered as potential methods of meeting the increased demand. All of these sources could serve relatively small load "pockets" and are particularly useful for serving individual customers or clusters of customers. These approaches were eliminated from further consideration because these types of installations cannot reasonably satisfy the Plymouth – Maple Grove area-wide projected load increase. The possible use of gas-fired combustion turbines located in the Plymouth – Maple Grove area to satisfy the projected load demand was also evaluated. Projected load requirements indicate that combustion turbines would be most desirable at each of the Arbor Lake, Cedar Island, and Plymouth substations (Ex. 2, Figure 1-7). Combustion turbines, properly located, could satisfy the increased demand levels without the need for construction of completely new transmission lines or the extensive upgrade of existing transmission lines.
- f) Underground lines. Underground transmission lines are not an alternative in themselves (they are a variation on the 115 kV

transmission line option) but they were reviewed as a potential construction method for the transmission line alternatives. If the proposed 115 kV transmission line was constructed underground, the estimated installed cost would be between \$23 and \$30 million, or two or three times higher than the Applicants' proposed above-ground 115 kV alternative. (Ouanes, Ex. 17, p. 22.)

40. The size and timing of Options 1-5 are similar in that these options would provide the capacity needed to satisfy the increased load during the planning period 2005-2026 at the seven substations responsible for the primary need for the proposed project. (Ouanes, Ex. 17, p. 23).

### **Option 2, through Option 4, Transmission Alternatives**

41. For the transmission options, the only size variation is between the proposed 115 kV line and the 69 kV lines considered under Options 2-4. However, in this circumstance the proposed 115 kV line is not significantly larger than comparable 69 kV lines, particularly in areas of double circuiting (under 69 kV Options 3 and 4) or in congested areas where larger poles and longer spans would be required for either a 115 kV LHVTL or a 69 kV transmission line. Ex. 2, Section 1.5.2.

42. All of the 69 kV options have a drawback in that appropriate voltage support cannot be maintained with line improvements alone due to the line lengths and anticipated loads. Thus, other improvements become necessary. Further, Options 2 and 3 face reliability concerns due to the distances to the 69 kV sources (from 6.6 to 8.6 miles). The 115 kV alternative effectively remedies these deficiencies. Ex. 2, Section 3.28, p. 41

43. The proposed 115 kV Option provides improved reliability over the 69 kV options. Historically, 115 kV systems experience fewer outages than 69 kV systems. This increased reliability is due to higher power poles, fewer poles, increased phase spacing, and longer line insulators. The eastern WHCEA distribution substation reliability is improved with the 115 kV Option. This Option includes new distribution transformers and high voltage distribution equipment with higher capacity ratings than the existing distribution transformers and equipment. The existing distribution transformers can be used elsewhere in the WHCEA system. (*Id.*)

44. The proposed 115 kV line is more appropriate than the other transmission options from a timing standpoint in that the new line construction would be completed by 2007 with no further line construction requirements until 2015. All other transmission options require much more construction over a relatively continuous period from 2005 to 2026. (*Id.* and Section 3.3.)

45. The Applicants also evaluated a Direct Current (DC) transmission line. A DC transmission line alternative would require six DC terminals at an additional cost of approximately \$162 million. This amount, which does not account for the line costs, is sixteen times larger than the installed cost for the proposed 115 kV line. In addition,

according to the Public Service Commission of Wisconsin's Final Environmental Impact Statement on the Arrowhead-Weston Electric Transmission Line Project, a DC line would have higher losses than an AC line for the same power capacity under a distance of 150 miles. (Ouanes, Ex. 17, p. 21, Ex. 18, S0-10.)

### **New Generation**

46. The proposed project can be constructed with as little as 4.25 miles of additional transmission right of way, contrasted with the need for as much as 30 acres of land, together with additional right of way for pipelines, for the generation option. Generation is also less desirable than transmission because of noise and cost. Generation would cost approximately eight times as much as the proposed project. (Ex. 2, Section 1.52, page 19.)

47. The cost for distributed generation varies greatly depending on the specific type of generation considered. The installed cost of distributed peaking generation for load pockets such as microturbines and diesel generators would be approximately \$2,000 per kW and \$450 per kW respectively. Given the need for 100 MW of capacity, the total cost for generation is estimated to be between \$200 and \$45 million, respectively, for the microturbines or diesel generators. In addition, each of up to 61 diesel generators units needed would require a long-term contract between GRE and the industrial owner to guarantee generator availability during peak load conditions. Moreover, the emissions would have a negative effect on the environment. Therefore, the Applicants and the Department concluded that distributed generation is not a reasonable alternative. (Ouanes, Ex. 17, p. 22.)

### **Cost of Proposed Facility and Energy Compared To Reasonable Alternatives**

48. Ex. 2, Table 4.1, reproduced below, shows comparative costs for Options 1 through 5 as determined by the Applicants.

**Table 4-1 Cost and Efficiency Factors for Options 1- 5**

	<b>Option 1</b>	<b>Option 2</b>	<b>Option 3</b>	<b>Option 4</b>	<b>Option 5</b>
	<b>115 kV Conversion</b>	<b>69 kV Upgrade</b>	<b>69 kV Split System</b>	<b>69 kV New Source</b>	<b>Generation</b>
Present Value Cost	\$9,550,000	\$15,979,000	\$18,431,000	\$12,268,000	\$75,759,000
Cost per kW	\$ 52	\$ 87	\$ 100	\$ 67	\$ 411

The cost figures include the combined costs to be incurred by GRE and WHCEA, including the present cost of future line losses to be anticipated under each of the options in addition to the actual capital outlay required for construction of facilities.

Operational and fuel costs are not included in the Option 5 (generation) costs. (Ex. 2, Section 4.1.)

49. Dr. Ouanes used the method proposed by the Company with a few modifications. ( Ex. 17, pp. 25-26, and Ex. 18, SO-14.) By the Department's calculation, the present value of the respective cost differences, when compared to the 115 kV line as a base cost, are respectively, \$3.9 million more for Option 2, \$5.7 million more for Option 3, \$1.1 million more for Option 4, and \$49.1 million more for Option 5. (Ex. 17, p. 24.)

### **The Effects of the Proposed Facility Upon the Natural Environment Compared to the Effects of Reasonable Alternatives**

50. The effects of each alternative on land use are described in Ex. 2, Section 10, and Ex. 3, pp. 5-8. The construction process is described in Ex. 2, Section 9. Because the proposed project would likely be built using existing right-of-ways, and only 4.25 miles of new right-of-way is required, the principal environmental impact would be during construction, and would be mitigated using best management practices. (Ouanes Ex. 17, p. 14.) Each of the 69 kV options involves upgrades to more miles of lines or requires additional rights-of-way (Options 3 and 4) than the proposed LHVTL. Ex. 16, SRR-4, pp. 15 and 16. The impact to the natural environment would be greater under Options 2, 3 and 4 due to the nature of the corridor (and the number of miles of transmission corridor where rebuilding activities would occur for these Options). Construction activities under Option 2, Option 3 and Option 4 would impact 54.2 miles, 64.6 miles and 39.8 miles respectively compared to 34.6 miles under Option 1. In addition, the transmission corridor in Option 1 would occur in more commercial/industrial development areas along the Interstate 494 corridor than the other alternatives' transmission corridors. (Ouanes, Ex. 17, p. 28.) Option 5 would impact only 10 miles of transmission corridor versus 34.6 miles for Option 1; however, this alternative would have air quality impacts and long-term land use impacts due to the construction of a combustion turbine at each of the Arbor Lake, Cedar Island and Plymouth substations. (*Id.*)

51. Transmission lines can produce a humming sound and occasional crackling sounds that are generally audible only in immediate proximity of the line. According to the Applicants, the noise level of the proposed 115 kV line should not exceed about 12 dB(A) at the edge of the right of way during fair weather conditions, and would either be essentially inaudible during dry weather conditions or reach 18 dB(A) during a heavy rain (1 inch per hour). These values are below the noise levels authorized under Minn. Rules pt. 7030.0030 and described in Ex. 2, Table 9-2 (page 144). (Ouanes, Ex. 17, p. 13.)

52 Electric fields and magnetic fields (EMF) are present around any electric device, such as power line, electrical wiring or appliance. More recent interest has focused on potential health effects of magnetic fields. The Minnesota Department of Health ("MDH") concluded that the current body of evidence is insufficient to establish a cause-and-effect relationship between EMF and adverse health effects. (Ex. 18, SO-3,



p. 4). In addition, according to the MDH, “magnetic fields very close to electrical appliances are often stronger than the fields directly beneath power lines. (Ouanes Ex. 17, p. 14 and Ex. 18, SO-3, p. 7.)

53. Over time, the electromagnetic field associated with the 115 kV alternative is less than for the 69 kV alternatives. Ex. 2, Section 9.1.

54. Noise concerns make the use of combustion turbines ill suited for urban residential areas. Combustion turbines also require additional land for their placement and the placement of the related substation equipment (approximately 30 acres), and they require access to high-pressure natural gas pipelines. For these reasons gas-fired combustion turbines are not an appropriate solution for the Plymouth – Maple Grove area. Ex. 2, Section 1.3.3, Section 1.52.

### **Effects on the Socioeconomic Environment Compared to Reasonable Alternatives**

55. The primary societal benefit of the proposed facility is the increased strength and reliability of WHCEA's system. The area served by this portion of the WHCEA system will continue to develop with residential, commercial and industrial uses. It is desirable that this development be accomplished efficiently and the availability of a strong and reliable electrical system is an essential element of such efficiency. The general development of this portion of the Twin Cities metropolitan area is desirable because it reduces urban sprawl by allowing growth without the need to expand into other more distant communities and the environmental detriments associated with sprawl (e.g., traffic congestion, automobile pollution, loss of farm land and open areas, etc.). Removing barriers to such development through an enhanced electrical system is another incidental benefit to society. Ex. 2, Section 2.2.

56. An additional societal benefit of the proposed new 115 kV transmission line is the reduction in generation requirements that will result from reduced line losses. The new line will reduce the need for generation capacity by 2.4 MW in 2005 when compared to the 69 kV Upgrade Options.

57. The Applicants would pay property taxes to local units of governments that average about 2.5 percent of the construction costs. As such, these local units of government would not obtain these tax revenues without the facility. (Ouanes Ex. 17, p. 14.) In addition, landowners on whose property the line is placed receive a property tax credit in proportion to the length of line crossing their property. Ten percent of the assessed value of the line is distributed to landowners in this way. (See Minn. Stat. § 273.425, and Ouanes Ex. 17, p. 15.)

58. The effect of the line on property values in commercial and industrial areas would not be significant and would be minimal in residential areas. (Ouanes, Ex. 17, p. 29, Ex. 18, SO-4, Response to IR. 70.)

59. Applicants expect between 15 and 25 additional temporary jobs to be created during construction, and that no permanent jobs would be created by the transmission options. With respect to Option 5, GRE expects that up to 100 workers would be required on site during peak construction activity, 1 or 2 employees during operating periods and 25 employees during repair outages. (Ouanes Ex. 17, p. 29.)

**The Expected Reliability of the Proposed Facility  
Compared to Reasonable Alternatives**

60. Table 4-1 from Ex. 2, reproduced in part below, shows comparative service life, and estimated annual availability for Options 1 through 5.

**Table 4-1 Cost and Efficiency Factors for Options 1- 5**

	<b>Option 1 115 kV Conversion</b>	<b>Option 2 69 kV Upgrade</b>	<b>Option 3 69 kV Split System</b>	<b>Option 4 69 kV New Source</b>	<b>Option 5 Generation</b>
Service Life (Years)	30	30	30	30	30
Est. Annual Availability	99.99%	99.99%	99.99%	99.99%	95%

61. GRE's 115 kV transmission system experienced an average of 1.7 outages per year and 0.19 hours of annual outages per substation. In comparison, GRE's 69 kV transmission system experienced an average of 4.57 outages per year and 0.63 hours of annual outage time per substation. (Ouanes, Ex. 17, p. 30.)

**(iv) The Benefits of the Proposed Facility to Society in a Manner Compatible with Protecting the Natural and Socioeconomic Environments, including Human Health**

62. The Assessment of Need Criteria set forth in Minn. Rules pt. 7849.0120(C), requires a determination that, by a preponderance of the evidence on the record, the Project will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including health, and specifically considering the following:

- a) the relationship of the proposed facility to overall state energy needs;
- b) comparison of the effects of the proposed facility upon the natural and socioeconomic environments as opposed to not building the facility;

- c) effects of the proposed facility in inducing future development; and
- d) socially beneficial uses of the output of the proposed facility, including its uses to protect or enhance environmental quality.

### **The Relationship of the Proposed Facility to Overall State Energy and Capacity Needs**

63. The primary purpose of the proposed 115 kV transmission line is to adequately and reliably serve load in the Plymouth-Maple Grove area. Ex. 2, Section 1.53. GRE has participated in the Mid-Continent Area Power Pool (MAPP), which facilitates the pooling of generation and transmission services. When the Plymouth-Maple Grove project was initially proposed MAPP provided the regional transmission planning and analysis to ensure that projects could be effectively interconnected to the upper midwest transmission grid. Many of the planning functions of MAPP are now transitioning to the Midwest Independent System Operator (MISO). Both with the former MAPP process and the newer MISO process, individual utility transmission plans are reviewed for compliance with regional reliability and compatibility with adjacent utility systems. The most current Regional Plan by MAPP recommends the construction of the proposed Plymouth-Maple Grove 115 kV LHVTL. Ex. 2, Section 5.3.

64. In its Executive Summary of the 2001 Energy Planning Report (Ex. 18, SO-24) the Department notes that “We must both upgrade existing transmission lines and build new ones to accommodate our growing electric demand and federal requirements for open access to the system.” The proposed project would enhance the transmission system reliability in that GRE would not have to shed load, beginning in 2005, to prevent damage to the transmission system under single contingency conditions. (Ouanes, Ex. 17, p. 12).

### **Effect of Facility on Natural and Socioeconomic Environment Compared to not Building the Facility**

65. If the facility were delayed between 1 and 3 years, line overloads would occur under single contingency peak load conditions.

66. Operational capacity of electric transmission and distribution systems is limited primarily by the need to prevent thermal overloads of the conductors. If too much current is transmitted through a conductor, it will overheat and the excess heat will cause the conductor to become elastic and sag. Eventually, the conductor will stretch permanently, leading to unsafe clearances to surrounding objects and limiting future current carrying capacity. As there is no way to reverse these effects, only rebuilding the line can restore its original capacity and safety clearances.

67. To prevent thermal overloads, GRE must cut load involuntarily—that is, temporarily “black out” portions of its system. A failure to do so would damage or destroy transmission and distribution lines; potentially leading to even longer blackouts until lines could be rebuilt.

68. Procedurally, when overloading of a line or transformer becomes imminent, the line or transformer is “opened.” In essence, it is taken out of service temporarily. Prior to re-closing (re-energizing) the facility, the load it must carry would be curtailed or shed in amounts described in Ex. 2, Tables 11-1 and 11-2. This load curtailment or load shed would be accomplished by opening a distribution breaker or breakers, which in turn de-energizes the portion of the distribution system fed through the subject breaker or breakers.

69. If no facility were built, demand would clearly exceed line capacity, resulting in the need to shed load. Ex. 2, Tables 11-1 and 11-2 show the amount of load shed required to prevent potential damage to GRE lines and equipment and customer equipment during single contingency and system intact conditions in selected years. Each table shows the estimated amount of load shed required under various demand forecast scenarios. Such service interruptions are likely to have adverse effects on the local economy, but estimates of these effects are not available. (Ouanes Ex. 17, p. 15.)

70. The primary societal benefit of the proposed facility is the increased strength and reliability provided to WHCEA’s system, which is needed to accommodate growth. The area served by this portion of the WHCEA system will continue to develop with residential, commercial and industrial uses. It is desirable that this development be accomplished efficiently, and the availability of a strong and reliable electrical system is an essential element of such efficiency. The general development of this portion of the Twin Cities metropolitan area is desirable because it reduces urban sprawl by allowing growth without the need to expand into other more distant communities and the environmental detriments associated with sprawl (e.g., traffic congestion, automobile pollution, loss of farm land and open areas, etc.). If the facility is not built, these benefits would be lost and replaced with potentially greater urban sprawl. (Ex. 2, Section 2.2.)

71. See Finding 57.

#### **Effects of Facility Inducing Future Development**

72. See Finding 30.<sup>[\[1\]](#)</sup>

#### **Socially Beneficial Uses of the Facility, Including To Protect or Enhance Environmental Quality**

73. See Findings 55-59.

#### **v. Compliance with Policies, Rules and Regulations**

74. The Assessment of Need Criteria set forth in Minn. Rules pt. 7849.0120(D) requires a determination that the record does not demonstrate that the design, construction, or operation of the proposed facility, or a suitable modification of the facility, will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

## **Compliance With Policies, Rules, and Regulations of Other Governmental Agencies**

75. There is no indication in the record that the design, construction and operation of the Project will fail to comply with relevant policies, rules and regulations of other state and federal agencies and local governments. (Rakow, Ex. 16, p. 21.) The issuance of a CON will not conflict with any other regulatory requirements. (Ex. 2, Sections 5.2.1, 5.2.2, 5.3, 9.1.2, 9.1.4, 9.1.5, and 9.1.6.)

Based on the foregoing Findings of Fact, the Administrative Law Judge makes the following:

### **CONCLUSIONS**

1. Any of the Findings of Fact that more properly should be designated as Conclusions are adopted as such.

2. The Commission has jurisdiction over this matter, pursuant to Minn. Stat. §§ 216B.08 and 216B.243.

3. All relevant substantive and procedural requirements of law and rule have been fulfilled.

4. The proposed LHVTL is needed to meet the growing electricity demands of WHCEA's customers in the Plymouth-Maple Grove service area.

5. Increasing planned conservation efforts is not a cost-effective alternative to the Project.

6. GRE and WHCEA do not promote electricity consumption in a manner that would affect the need for the proposed LHVTL.

7. Current and planned facilities not requiring certificates of need are not adequate to meet projected needs.

8. The proposed LHVTL will make efficient use of resources.

9. Denial of the CON would likely have an adverse effect upon the future adequacy, reliability and efficiency of energy supply to WHCEA customers in the Plymouth-Maple Grove service area.

10. Considering the size, type, timing, costs, natural and socioeconomic environmental effects, and reliability, a more reasonable and prudent alternative to the proposed LHVTL has not been demonstrated by a preponderance of the evidence on the record.

11. The proposed LHVTL will provide benefits to society in a manner compatible with protecting the natural and socioeconomic environments, including human health.

12. The record does not demonstrate that the design, construction, or operation of the Project will fail to comply with relevant policies, rules, and regulations of other state and federal agencies and local governments.

13. The requirements for a CON set forth in Minn. Stat. § 216B.243 and Minn. Rules Ch. 7849 have been satisfied.

THIS REPORT IS NOT AN ORDER AND NO AUTHORITY IS GRANTED HEREIN. THE MINNESOTA PUBLIC UTILITIES COMMISSION WILL ISSUE THE ORDER OF AUTHORITY WHICH MAY ADOPT OR DIFFER FROM THE FOLLOWING RECOMMENDATION.

Based on the foregoing Conclusions, the Administrative Law Judge makes the following:

### **RECOMMENDATION**

That the Certificate of Need be issued to Applicant Great River Energy and Wright-Hennepin Cooperative Electric Association to construct a 115 kV LHVTL, with end points at the Xcel Energy Elm Creek Substation and the Parkers Lake Substation, to serve customers in the Plymouth-Maple Grove service area of WHCEA and Connexus without condition.

Dated this 1<sup>st</sup> day of August 2003.

S/ Allan W. Klein

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ALLAN W. KLEIN

Administrative Law Judge

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<sup>[1]</sup> The statutory basis for an investigation into whether a facility induces future development was repealed by Minn. Laws 2001, ch. 212, Art. 7, Section 31.